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III.—*Eleocharis mutata* (L.) R. & S.

This plant was detected during the present season in Wolf Lake, along the eastern border of Chicago, and near the boundry line of Indiana. It grew in abundance but had hitherto escaped the notice of collectors in this vicinity, as I find no allusions to it in this locality. An examination of its flowers showed that they were proterogynous, the protruding style and stigmas being brown and withered while the stamens are still covered by the scales. A further study of the plants showed that the styles appear above the scales just after the spikes have risen out of the water from one to three or four inches. When the plants have stretched upward from six to twelve inches beyond their proterogynous stage, the anthers make their appearance above the scales. The spikes are about an inch in length at first, but increase in length and diameter as they become older, or reach their second stage. Then the anthers burst, and freely scatter the dry pollen about, some of which will lodge on the feathery stigmas. The plant is fertilized by the wind, or even by simple gravity, since the stems are near together, several rising from the same rhizome. The elevation of the spikes when the stamens appear, bringing them above the younger flowers in which the stigmas are ready to receive the pollen, facilitates its reaching them at a level so much below, since it may simply drop upon them. But the wind, either directly or by agitating the water and shaking the stems, must be regarded as the principal agent in the cross-fertilization of the flowers. The inflorescence of the spikes is centrifugal, the older stamens being mostly above. Belated stamens sometimes appear without anthers. They rise above the scales as pale elongations of filaments, a little enlarged at the top.

ENGLEWOOD, CHICAGO.

### Variations in the Rootstock of *Smilax glauca* dependent upon Environment.

On the south beach of Staten Island, at the line of high water, there are often a number of hard, gall-like bodies, lying on the sand. These are sea-worn parts, often single tubers, from the rootstock of the cat-brier, probably in every case from *Smilax glauca*. This species grows on the bluffs that are constantly

breaking away, and by this and other means, sections of the root-stock finally reach the beach and are worn by the waves until the tough roots, that have their origin particularly in the tubers, are reduced to spine-like processes.

*Smilax glauca* not only grows on sandy bluffs and dunes, but also in low land, that for a portion of the year is quite wet. These conditions produce their effect upon the plants, and those occupying the dry and sandy places are not, in every particular, like those that have grown on moister ground. There is not only the usual difference between plants that grow on dry places and on damp ones, namely: a difference in depth of root, but there is also a variation of growth, which is evidently useful and adapted to environment.

The rhizomas of *Smilax glauca* are always tuberiferous, the tubers being occasionally connected to the rootstock at one end only, but generally they are swellings, sometimes of single nodes and sometimes of several nodes coalesced, that form along the rhizoma itself, and are centers of collected nourishment. Many of the upright leaf-bearing branches, as well as the main and more robust roots, are connected with these tubers, and when the tubers consist of several coalesced nodes, the roots grow from them in circles of some regularity, but the coalescence is also plainly seen in some instances, without the aid of the accompanying roots.

The change of growth with change of condition, mentioned above, is especially noticeable in these tubers, which appear to be more numerous on plants growing on dry, sandy stations, to have a greater number of roots starting from them and fewer from the internodal spaces, and also to be often of larger size, than on plants occupying moister situations. This is easily explained, for they have more need of stored moisture and nourishment than those of the low, wet ground. Also in these latter plants the spaces between the nodes are greater than in those occupying the dunes.

WM. T. DAVIS.